

Explanation of User-Adjustable Inputs

VoIP Customer Calling Characteristics (User-Adjustable Inputs #5 and #6)⁶⁹

User-Adjustable Inputs and their default values (value is not allowed to change during the forecast period):

VoIP customers exceed average originating toll patterns	<u>2</u>
VoIP customers exceed average terminating toll patterns	<u>1.5</u>

Because VoIP is in its early stages of market penetration, it would be incorrect to assume in the model that the segment of the market that adopts VoIP is representative of consumers with average calling patterns. It is likely that those consumers who find VoIP most attractive, and, therefore, those consumers who are likely to be among the first to adopt VoIP, are consumers with higher than average long distance usage. Such high-usage consumers will find VoIP particularly appealing due to savings associated with flat-rated VoIP pricing. Because this high volume segment of the market is most likely to adopt VoIP during the study period, the model incorporates a user-adjustable input that allows the user to inform the model as to the anticipated usage for VoIP adopters relative to average PSTN users. Values in excess of 1 recognize that consumers who adopt VoIP are likely to originate and terminate more long distance calls than a typical customer. QSI has selected a value of 2 for the originating traffic (*i.e.*, customers who adopt VoIP during the study period are expected to originate twice as much non-local traffic as average ILEC PSTN customers). On the terminating side, QSI selected a value of 1.5, which means that VoIP customers will receive one and one-half times as much non-local traffic as the average ILEC PSTN customer.

Non-RBOC Rural vs. RBOC and Non-rural Other ILECs VoIP Adoption Characteristics (User-Adjustable Input #10)⁷⁰

User-Adjustable Input and its 2005 default value:

Difference in VoIP Adoption between RBOC/non-rural other ILECs and Non-RBOC Rural Territories (factor)	<u>1</u>
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Whether accurate or not, it is often assumed that rural areas of the U.S. have lagged behind non-rural areas in terms of access to high-speed Internet services. Even if this were true as a general matter, the FCC has recently announced that the “digital divide” is shrinking dramatically (*see, infra*, Section IV.A). It is logical to assume that limited access to high-speed internet services would translate to lower VoIP adoption rates, but because rural consumers are more likely to have a higher proportion of their usage attributable to toll calling (relative to urban consumers) and one of VoIP’s most enticing attributes is potential savings on toll calls, rural consumers may have greater incentive to

⁶⁹ VoIP Impact Model, User-Adjustable Inputs Tab, rows 9 and 10.

⁷⁰ VoIP Impact Model, User-Adjustable Inputs Tab, row 14.

Explanation of User-Adjustable Inputs

adopt VoIP than non-rural consumers. As such, arguments can be made that rural consumers will adopt VoIP at either a higher or a lower rate than non-rural consumers. The model allows users to perform analyses based on either assumption by including a user-adjustable input reflecting a rural differential related to VoIP adoption. A value less than one means that non-RBOC rural areas are slower than RBOC and non-rural other ILEC areas in adopting VoIP, while a factor greater than 1 means that non-RBOC rural areas are faster than RBOC and non-rural other ILEC areas in adopting VoIP. QSI selected a default input of 1, meaning that the model assumes no relative difference in non-RBOC rural and RBOC and non-rural other customer VoIP adoption.

C. Level 3 Petition Volumes and Outcome Scenarios

Volumes Subject to the Level 3 Petition (User-Adjustable Input #11)⁷¹

User-Adjustable Input and its 2005 value:

Probability that Locally Dialed Call to VoIP is Terminated Non-locally	20%
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As explained above, in the *Level 3 Petition*, forbearance is not requested with respect to traffic that originates from a PSTN caller using a 1+ or 10XXX dialing arrangement. In those situations, the ILEC routes the call to the presubscribed or caller-selected IXC and the IXC delivers traffic to the LEC serving the VoIP provider, with access charges continuing to apply to the exchange between the ILEC and the IXC. Hence, the model has been designed to remove volumes associated with calls from a PSTN customer to a VoIP customer that terminate non-locally using 1+ or 10XXX. The model performs this adjustment by applying a user-adjustable input representing the *probability that a locally dialed call is terminated non-locally* to terminating volumes replaced by VoIP. The default value for this probability is set to 20% and is based on reasoning that, in the near future, the above described situations are likely to constitute a minority of events. Another reason why a relatively low probability value was chosen is to account for the reverse situation that is not explicitly quantified in the model – *i.e.*, when a 1+ dialed call from a PSTN customer to a VoIP customer terminates locally. In this situation, an ILEC would be receiving access charges from the IXC of the PSTN customer despite the fact that the call is local.

⁷¹ VoIP Impact Model, User-Adjustable Inputs Tab, row 15.

Explanation of User-Adjustable Inputs

Suppression and Stimulation (User-Adjustable Inputs #4, #7, #8)⁷²

User-Adjustable Inputs and their 2005 values:

Suppression of VoIP Line Growth if VoIP traffic is priced at access rates (factor)	0.8
Stimulation of VoIP Originating Traffic due to lower prices when VoIP is under RECIPROCAL COMPENSATION regime (factor)	1.1
Stimulation of VoIP Originating Traffic due to lower prices when VoIP is under INTERSTATE ACCESS regime (factor) only rather than both interstate and intrastate access rates	1.05

As described above the model assumes that, depending upon the outcome of the *Level 3 Petition* and/or *IP-Enabled Services NPRM*, IP-enabled traffic will be priced either at reciprocal compensation rates (*Scenario 1*) or interstate switched access rates (*Scenario 2*) – intrastate switched access rates will not apply. These different VoIP compensation scenarios will impact the underlying costs for providing VoIP, and as such, will impact the pricing of VoIP services to end users. In turn, these end-user prices will impact the ultimate demand for VoIP. The model allows the user to account for these pricing impacts through user-adjustable inputs that can be adjusted to account for the stimulation and suppression of VoIP traffic depending on the intercarrier compensation scenario that applies. QSI selected a factor of 0.80 for the first input – *suppression of VoIP line growth if VoIP is priced at access rates*. A value of 0.80 means that demand for VoIP line counts will be 20% lower if VoIP traffic is exchanged at interstate access rates rather than reciprocal compensation rates. The second factor – *stimulation of VoIP originating traffic due to lower prices under reciprocal compensation* – applies to volumes originating on VoIP only. This factor recognizes that VoIP customers will make more calls due to lower-priced, often flat-rated long distance service offerings provided by VoIP, and also considers lower VoIP provisioning costs than PSTN long distance. QSI selected a default value of 1.1, which means that VoIP customers will make 10% more non-local calls using their VoIP services than they did using their switched access line (assuming reciprocal compensation applies to VoIP traffic). The third factor accounts for calling stimulation that would occur for VoIP traffic if interstate switched access charges apply to this traffic. The reasoning supporting this adjustment is that call stimulation will occur for VoIP traffic exchanged at interstate access relative to volumes that occur for PSTN traffic exchanged at intrastate/interstate. This stimulation factor (1.05) is set lower than the stimulation factor under reciprocal compensation (1.1) because interstate access rates are higher than reciprocal compensation rates and the stimulation values are related to there relative intercarrier compensation levels. Yet, call stimulation will still occur for VoIP under interstate access when compared to PSTN toll calls. The 1.05 default value for this factor assumes that customers will make 5% more calls after migrating to VoIP exchanged at interstate switched access rates (5% more than they did when using the

⁷² VoIP Impact Model, User-Adjustable Inputs Tab, rows 8, 11, 12.

Explanation of User-Adjustable Inputs

PSTN wherein a combination of both higher priced intrastate access and interstate access had to be considered).

D. Access Revenue

Assumed Future Changes in Access Rates (User-Adjustable Inputs #14)⁷³

User-Adjustable Input and its 2005 value:

Assumed Annual Change in Interstate Access Rate	0%
Assumed Annual Change in Intrastate Access Rate	-5%

Due to the ongoing effort to remove implicit subsidies from switched access charges, user-adjustable inputs have been incorporated into the model to allow users to assume future reductions in interstate and intrastate switched access rates. QSI has selected a value of 0% for interstate access rates, which means that no change is assumed. To the extent that a user believes that federal initiatives (e.g., the FCC's upcoming further notice on intercarrier compensation) will result in future reductions in interstate switched access rates, this value could be changed to reflect a negative value. To the extent further switched access charge reductions are assumed, the "Impact" (i.e., difference between *Scenario 1* and *Scenario 2*) identified by the model is diminished. QSI has selected a (-5)% default value for intrastate access rates to account for state initiatives designed to close the gap between interstate and intrastate switched access charges.

E. Reciprocal Compensation Revenue

ISP Reciprocal Compensation Rate (User-Adjustable Input #15)⁷⁴

User-Adjustable Input and its 2005 value.

ISP Reciprocal Compensation Rate	\$0.0007
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QSI utilized a rate of \$0.0007 per-minute for reciprocal compensation. As mentioned above, the basis for this rate is the FCC's *ISP Reciprocal Compensation Remand Order*, which required that, to the extent ILECs select a rate of \$0.0007 for ISP-bound traffic,

⁷³ VoIP Impact Model, User-Adjustable Inputs Tab, rows 22 and 23.

⁷⁴ VoIP Impact Model, User-Adjustable Inputs Tab, row 27.

Explanation of User-Adjustable Inputs

they must offer to exchange all non-access traffic at that rate.⁷⁵ It is our understanding that the majority of all RBOCs and non-rural other ILECs have made this selection.

F. ILEC DSL and VoIP Offset Assumptions

While ILECs often argue that continued adoption of VoIP under the current regulatory regime would result in a reduction in ILEC access charge revenue, the positive revenue impacts of maintaining the status quo are seldom discussed. The model accounts for the positive impacts of continued VoIP adoption under both *Scenarios 1* and 2, allowing for the user to adjust various inputs as discussed below.

DSL Stimulation (User-Adjustable Inputs #16, #12, and #13)⁷⁶

User-Adjustable Inputs and their 2005 values:

% DSL lines that are ILEC DSL (not CLEC or IXC DSL)	93%
% DSL-based VoIP Lines Where DSL is Ordered Because of VoIP Availability	15%
Assumed Monthly DSL End-User Revenue (per DSL customer)	\$ 30.00

Since it is assumed that access to a broadband connection is a prerequisite to VoIP adoption, to the extent that customers do not currently have a broadband connection and are interested in subscribing to VoIP, they must first purchase broadband connections. Some of these customers will purchase DSL lines from an ILEC in order to have access to VoIP. Because of the complementary characteristics of VoIP and DSL, consumer demand for VoIP will increase demand for DSL. The model recognizes this relationship by allowing the user to quantify the positive impact on ILEC DSL revenue resulting from increased VoIP demand. QSI assumes that 93% of DSL lines are provided by the ILEC, based on actual data from the *ALTS State of Competition Report* July 2004.⁷⁷ In addition, QSI assumes that 15% of new DSL lines over the study period are prompted, at least in part, by consumers wishing to use VoIP services. Furthermore, the model allows users to adjust the monthly recurring rate charged by ILECs for DSL, which is assumed by QSI to be \$30.00 per month. This rate is based on the current monthly DSL prices offered by RBOCs (*see, infra*, Section IV.E).

⁷⁵ See *ISP Remand Order*, 16 FCC Rcd at 9156-57 ¶8.

⁷⁶ VoIP Impact Model, User-Adjustable Inputs Tab, rows 28, 16, 17.

⁷⁷ ALTS Status of Competition Report, July 2004 at 17. See VoIP Impact Model, Data VoIP Projections Tab.

Explanation of User-Adjustable Inputs

Note that the above listed DSL-related inputs apply to both Scenarios, so that the impact of imposition of the access regime on the DSL revenues is captured only through the general suppression of VoIP lines (resulting in suppression of DSL-based VoIP lines).

VI. DETAILED RESULTS

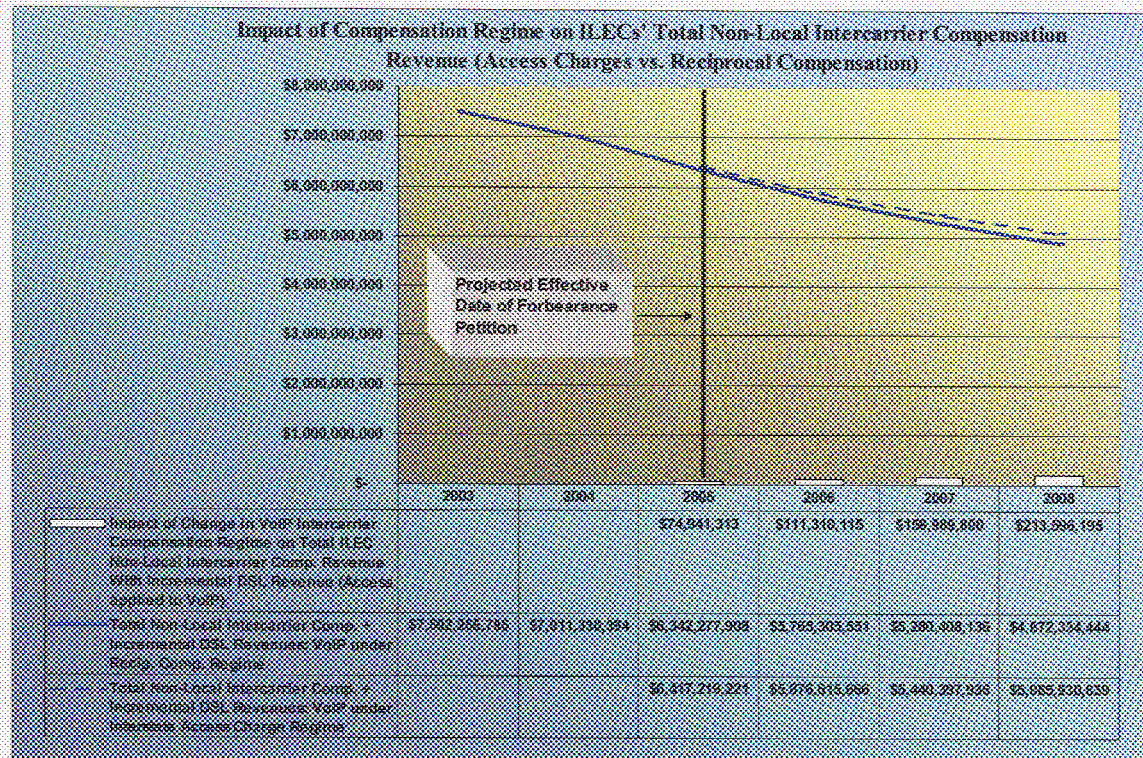
The remainder of this report provides a detailed description of the model results. Where applicable, references have been made to the *VoIP Impact Model* so that interested readers can review these results in their native (and executable) form.

GENERAL NOTE: The tables and charts in the *Results* Tabs are color-coded to ease identification of data sources and lines in the charts. Generally, **red color** denotes narrow measures – measures of intercarrier revenues associated with non-local traffic, while **blue color** denotes broader measures – intercarrier revenues and incremental DSL revenues (where DSL is incremental to non-local service, specifically, VoIP). Solid line — refers to *Scenario 1*, while a dashed line --- refers to *Scenario 2*.

A. Summary Results

The graph and accompanying chart below is taken from Tab “High Level Impact Chart” of the *VoIP Impact Model*. This graph illustrates the impact of each compensation Scenario - *Scenario 1* and *Scenario 2* - on total ILEC intercarrier non-local revenue. Stated differently, one could interpret this graph as showing the impact of the application of interstate switched access versus reciprocal compensation to VoIP traffic covered by the *Level 3 Petition*, and as such, these results constitute the primary output of the model. As shown, when incorporating the incremental DSL revenue that ILECs will receive due to VoIP, ILECs are forecasted in 2008 to collect \$213,596,195 more in total intercarrier non-local traffic revenue if interstate access applies compared to the scenario where reciprocal compensation applies. The differential between the blue solid line and blue dashed line (shown also as the white bar graph on the x axis) represents the impact on total ILEC intercarrier non-local traffic revenue attributable to the decision to apply interstate access (instead of reciprocal compensation) to VoIP traffic covered by the *Level 3 Petition*. As shown, this impact will gradually grow from \$74,941,313 in 2005 to \$213,596,195 in 2008. More details about these and other results of the model are provided in the following sections of the report.

Detailed Results



B. Results – Impact of Applying Access

Tab *Results – Impact of Applying Access* consists of three charts and three data tables.

The table below, copied directly from the *Results – Impact of Applying Access* Tab, provides a summary and the main source data for charts of this Tab.

IMPACT OF CHANGES IN INTER-CARRIER COMPENSATION REGIME FOR VOIP ON LARGE ILECS' INTER-CARRIER NON-LOCAL COMPENSATION REVENUES, WITH AND WITHOUT CHANGES IN INCREMENTAL DSL REVENUES DUE TO VOIP AVAILABILITY							
	Actual - Baseline	Projected Access Revenues (2004 - 2008)					
	2003	2004	2005	2006	2007	2008	
3 = calculation	Forecasted Access Revenue Decline (Based on User-Avg. Impact for Access Rates and actual MOU trends)		-7.30%	-10.88%	-10.82%	-10.72%	-10.74%
9 = calculation	Access Revenues (RISC + Non-Rural Other LECs) per ARMS 43-04	\$ 7,435,335,135	\$ 6,887,484,919	\$ 6,138,227,865	\$ 5,473,210,901	\$ 4,882,725,031	\$ 4,358,215,318
10 = 1 + 2	Total ILEC Non-Local Inter-carrier Compensation Revenue: VoIP under Reciprocal Compensation Regime	\$ 7,438,617,735	\$ 7,892,543,214	\$ 8,148,790,358	\$ 8,499,585,219	\$ 8,886,334,231	\$ 9,331,428,580 red line
11 = 1 + 3	Total ILEC Non-Local Inter-carrier Compensation Revenue: VoIP under Inter-carrier Access Charge Regime			\$ 6,088,732,161	\$ 5,622,841,391	\$ 5,136,798,637	\$ 4,702,553,363 dashed red line
12 = 10 + 4	Total Non-Local Inter-carrier Comp. + Incremental DSL Revenues: VoIP under Recip. Comp. Regime	\$ 7,982,356,785	\$ 7,911,330,394	\$ 8,345,227,369	\$ 7,765,305,531	\$ 5,390,408,138	\$ 4,672,334,444 blue line
13 = 11 + 4	Total Non-Local Inter-carrier Comp. + Incremental DSL Revenues: VoIP under Inter-carrier Access Charge Regime			\$ 6,417,219,221	\$ 6,876,615,646	\$ 5,440,237,335	\$ 5,085,330,639 dashed blue line
14 = 12 - 2	Impact of Change in VoIP Inter-carrier Compensation Regime on Total ILEC Non-Local Inter-carrier Compensation Revenue With Incremental DSL Revenue (Access applied to VoIP)			\$ 164,858,622	\$ 153,273,275	\$ 246,037,615	\$ 251,722,175 dashed and solid red line
15 = 14 / 10				2.3%	2.0%	4.5%	5.3%
16 = 14 + 5 - 4	Total ILEC Non-Local Inter-carrier Compensation Revenue: VoIP under Reciprocal Compensation Regime + Incremental DSL Revenue: VoIP under Inter-carrier Access Charge Regime			\$ 6,417,219,221	\$ 6,876,615,646	\$ 5,440,237,335	\$ 5,085,330,639 dashed and dotted blue line
17 = 16 / 12				7.8%	8.9%	9.9%	10.9%

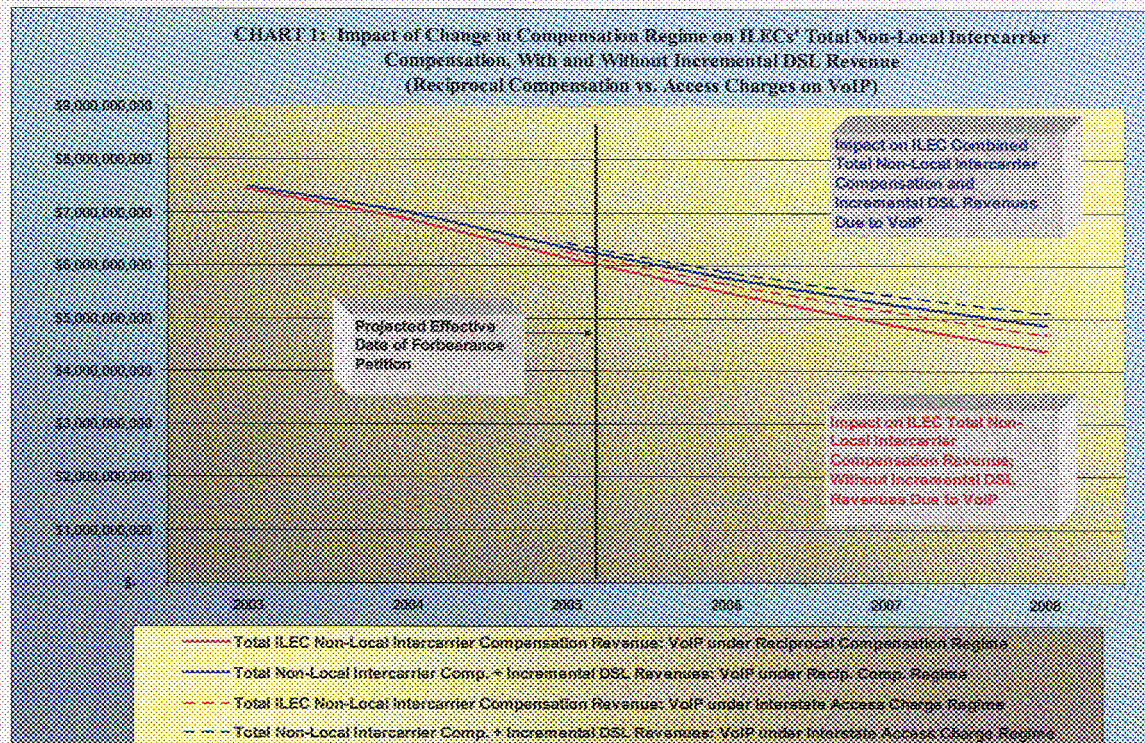
Detailed Results

The text highlighted in red (lines 10 and 11) shows the total intercarrier compensation revenues (on both non-local VoIP and traditional toll traffic) that RBOC and non-rural other ILECs would receive under *Scenario 1* (reciprocal compensation applies to VoIP) and *Scenario 2* (interstate switched access applies to VoIP), respectively. The differential between these two lines is shown on lines 14 and 15 ("Impact of Change in VoIP Intercarrier Compensation Regime on Total ILEC Non-Local Intercarrier Compensation Revenue - Access Applied to VoIP"). This line represents the difference in total non-local intercarrier compensation revenue between *Scenario 1* and *Scenario 2*. Hence, to the extent that the FCC changes the status quo and applies interstate switched access to VoIP traffic covered by the *Level 3 Petition*, ILECs would receive \$114,056,833 (or 1.9% of total non-local intercarrier compensation revenue) more in intercarrier compensation revenue in 2005 and \$311,777,766 (or 7.1% of total non-local intercarrier compensation revenue) more in 2008. As will be shown below, this stands in contrast to the historical trend of switched access revenue for ILECs that exhibits a significant decrease over time.

The text highlighted in blue (lines 12 and 13) shows the total intercarrier compensation revenues that ILECs would receive under *Scenarios 1* and *2* as well as the incremental DSL revenue that ILECs are likely to receive as a result of VoIP. The differential between these two lines is shown on lines 16 and 17 ("Impact of Change in VoIP Intercarrier Compensation Regime on Total ILEC Non-Local Intercarrier Compensation Revenue with Incremental DSL Revenue - Access Applied to VoIP"). As this line demonstrates, once the model accounts for the increase in DSL revenue caused by VoIP, this differential narrows (meaning that the incremental DSL revenue due to VoIP will mitigate the difference in total revenue to ILECs - intercarrier compensation revenue + incremental DSL revenue - between *Scenario 1* and *Scenario 2*). Specifically, by accounting for incremental DSL revenue, the differential in total revenues between *Scenario 1* and *Scenario 2* is only \$74,941,313 (or 1.2% of total non-local intercarrier compensation revenue) in 2005, growing to \$213,596,195 (or 4.4% of total non-local intercarrier compensation revenue) in 2008.

Detailed Results

Chart 1: Impact of Change in Compensation Regime on ILECs' Total Non-Local Inter-carrier Compensation, With and Without Incremental DSL Revenue (Reciprocal Compensation versus Access Charges on VoIP)



The data contained in lines 10 and 12 of the table above are depicted in Chart 1. This chart draws total inter-carrier compensation revenues (on both non-local VoIP and traditional toll traffic) under *Scenarios 1* (solid lines) and *2* (dashed lines), with and without addition of incremental DSL revenues. For example, for 2008, this chart shows that total inter-carrier revenues without incremental DSL and under *Scenario 1* are projected to be approximately \$4.4 Billion (the exact data point is \$4,381,429,589), while under *Scenario 2* these revenues are projected to be approximately \$ 4.7 Billion (the exact data point is \$4,693,207,353) – the difference being relatively small at \$311,777,766.

Detailed Results

Chart 2: ILECs Benefit From Applying Access to VoIP is Offset by Reduced VoIP-Related Stimulation of DSL Subscribership

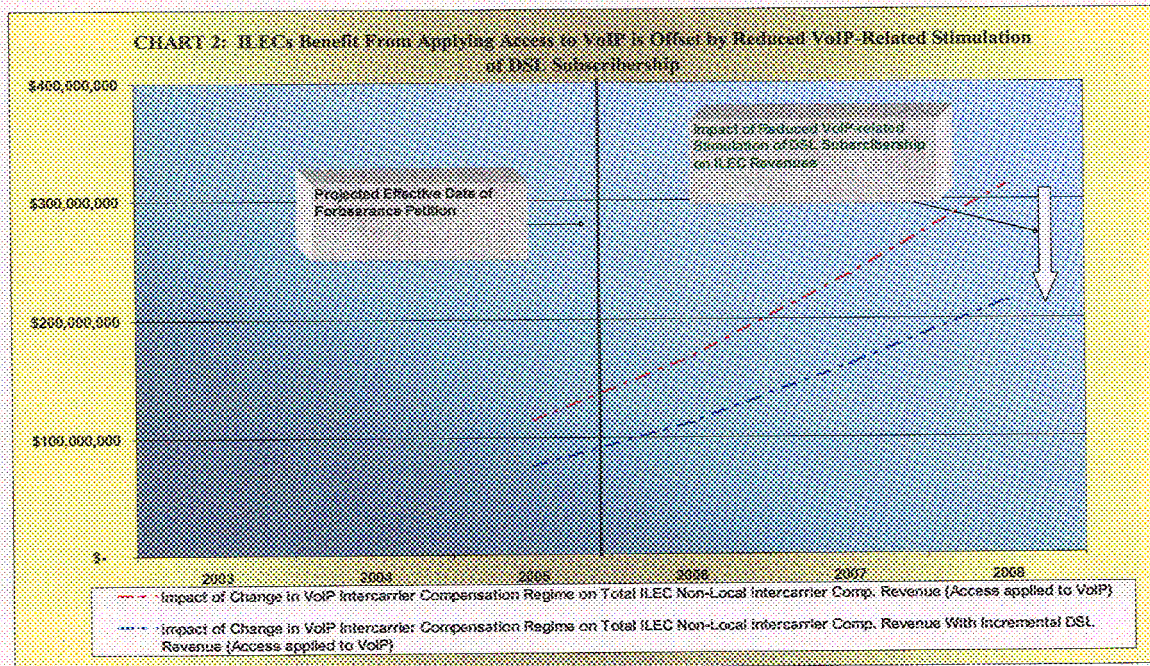
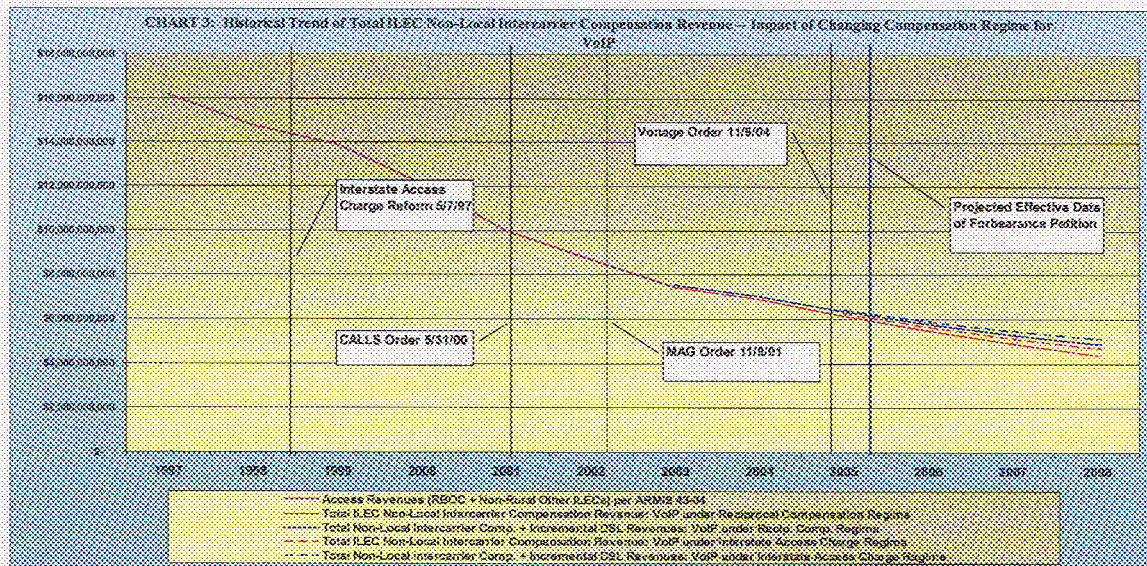


Chart 2 measures the difference between *Scenarios 1* and *2* in isolation from total access revenues. Geometrically, it depicts the vertical distances between solid and dashed lines of Chart 1, which are represented on Chart 2 by dashed and dotted red line (--- • ---). As shown on Chart 2, the red line represents the impact on ILEC intercarrier compensation revenues between interstate access and reciprocal compensation (\$311,777,766 in 2008) and the blue line represents this same impact with incremental DSL revenues included (\$213,596,195 in 2008). As Chart 2 shows, moving from *Scenario 1* (VoIP under reciprocal compensation) to *Scenario 2* (VoIP under interstate access) results in additional intercarrier compensation revenues (red line), but also in reduced incremental DSL revenues (not depicted separately). The total impact (blue line) is less than the direct impact because of the offsetting loss in DSL revenues.

Detailed Results

Chart 3: Historical Trend of Total ILEC Non-Local Inter-carrier Compensation Revenue – Impact of Changing Compensation Regime for VoIP



Like Chart 1, Chart 3 projects the impact on ILEC switched access revenue from either granting the *Level 3 Petition* or changing current rules to apply access to IP-PSTN VoIP, but Chart 3 also illustrates a longer historical trend of ILEC switched access revenues along with key milestones of federal access charge reform. As shown in Chart 3, ILEC switched access revenues have fallen from over \$16 Billion in 1997 to under \$8 Billion in 2003. Chart 3 also shows that, among other things, the FCC's access charge reform efforts that took place during this period (e.g., *CALLS Order*, *MAG Order*) have led to a trend of falling switched access revenue for ILECs. Most importantly, however, Chart 3 shows that even if the FCC decides that reciprocal compensation should apply to VoIP, consistent with the *Level 3 Petition*, until the transition to a new intercarrier compensation regime, everything else equal, ILEC switched access revenues will decrease less during the study period (from projected date of forbearance in 2005 through 2008) than in any other four-year period shown in the historical analysis.

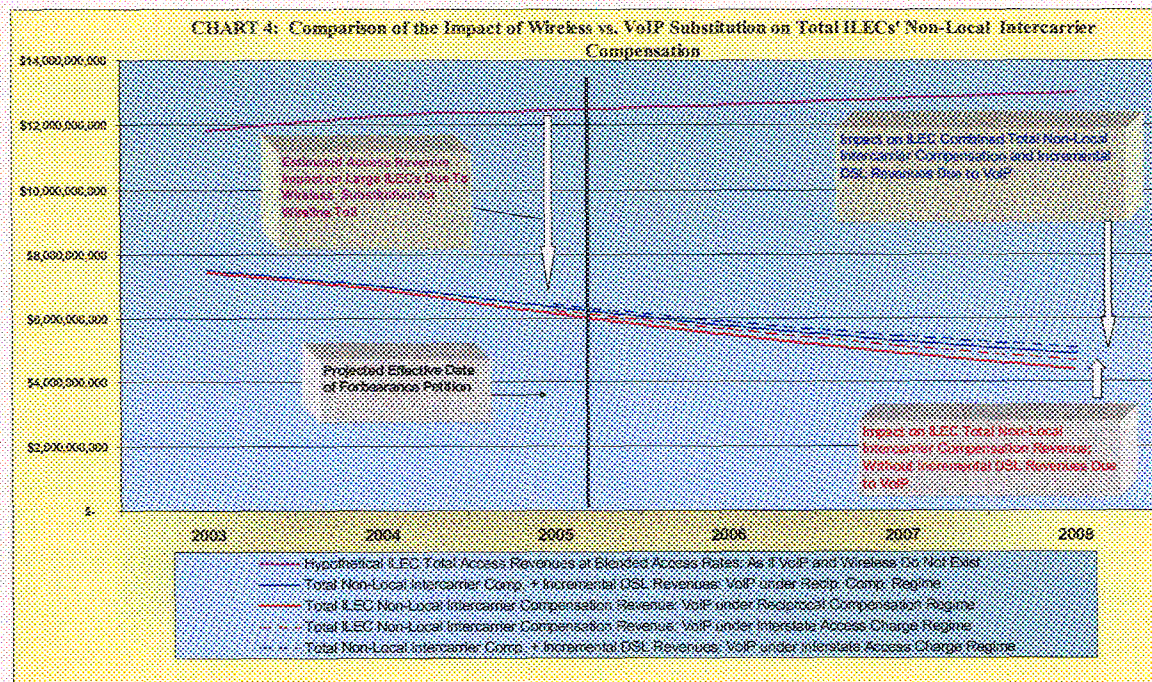
C. Results – VoIP vs. Wireless

Chart 4: Comparison of the Impact of Wireless vs. VoIP Substitution on Total ILEC Non-Local Inter-carrier Compensation

In order to show in context the impact on ILEC switched access charge revenue due to applying access charges or reciprocal compensation, QSI developed Chart 4, which shows the impact of the reciprocal compensation versus interstate access charges for IP-PSTN VoIP on ILEC non-local intercarrier compensation revenue accounting for access

Detailed Results

volumes lost to wireless substitution. The red and blue lines are taken from Chart 1 and represent total intercarrier compensation revenue for non-local traffic under *Scenarios 1* and *2*. The purple line represents total ILEC intercarrier non-local revenue under a hypothetical scenario that neither wireless nor VoIP replace traditional toll minutes (*i.e.*, that all non-local minutes continue to be rated at jurisdictional access rates). The purpose of calculating this hypothetical revenue is to create a baseline around which the impact of wireless substitution and VoIP substitution can be compared.⁷⁸ Stated differently, the purple line represents a hypothetical *pool* of total ILEC non-local intercarrier compensation revenue based on the assumption that all minutes remain on the PSTN for origination and termination. As Chart 4 shows, the impact of wireless substitution (or the difference between the purple line and the blue/red lines) is much greater than the impact attributable to the *Level 3 Petition* (or the difference between the red solid and red dashed lines and the difference between the blue solid and blue dashed lines). While the impact of the *Level 3 Petition* on ILEC intercarrier non-local revenues increases over time, wireless substitution continues to dwarf the VoIP impact for the entire study period.



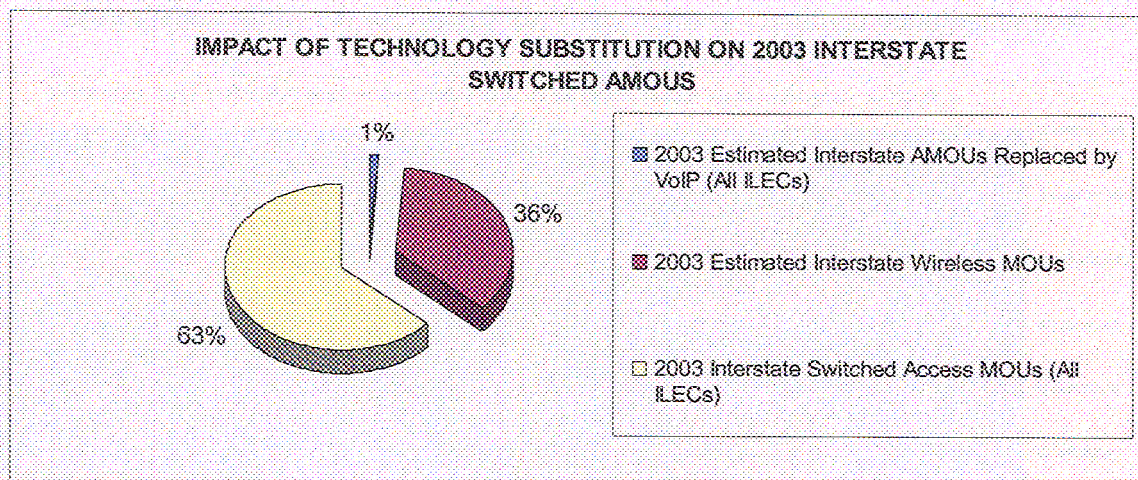
⁷⁸ See Section 4 for details on the derivation of the access revenues substituted by wireless.

Detailed Results

D. VoIP Traffic As Percent of Non-Local Minutes/Composition of MOUs

Impact of Technology Substitution on Interstate Switched Access Minutes-of-Use

The data for this section can be found on the *VoIP Traffic as % of Non-Local* Tab and *Composition of MOUs* Tab. While Chart 4 shows relative impacts on ILEC access revenue from wireless and VoIP substitutions in terms of total revenue, the following pie charts show this impact in terms of total minutes-of-use. The first chart displays results for 2003:



As the above chart shows, we estimate that wireless services have replaced about 36% of PSTN interstate toll minutes of use, while VoIP services have replaced about 1%. This same data is provided below for year 2008 to show how these substitution effects will change over time.